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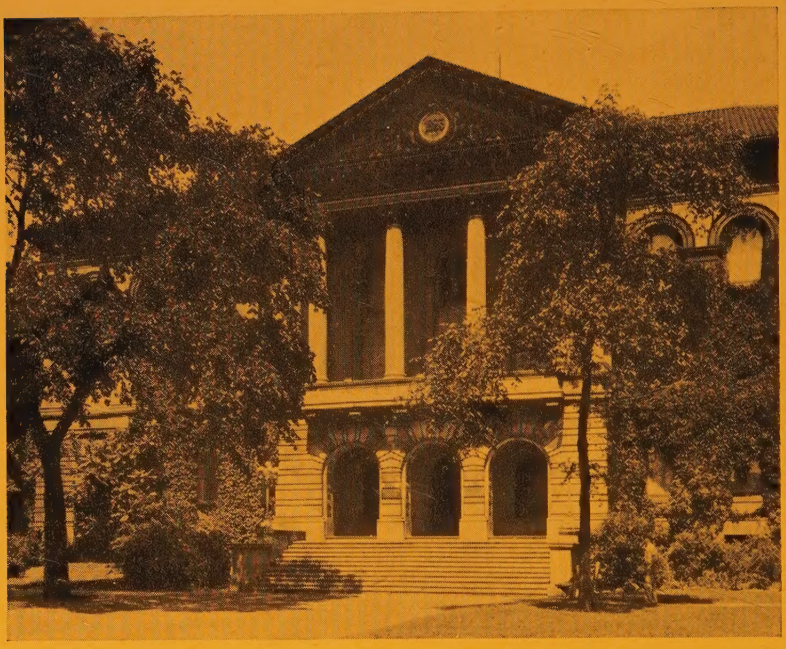

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Contents

What is a Naturalist? A Study in Natural History, 2 51
Karl P. Schmidt

Earthworms and Their Neighbors 64
T. H. Eaton, Jr.

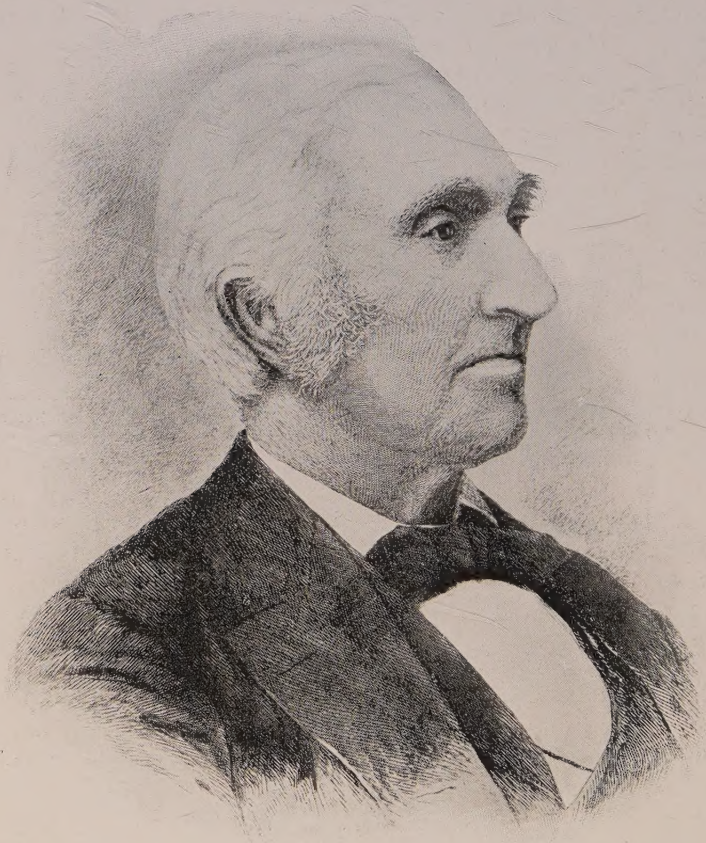
Notes from the Field 67

Calendar for Microscopical Work and Collecting 68
J. E. Nielsen

Fiftieth Anniversary of Academy Building 69
Harriet M. Smith

Museum Activities 70

The Naturalist's Book Shelf 73



MATTHEW LAFLIN

Benefactor of the Academy

October 10th, 1943, marked the 50th anniversary of the laying of the cornerstone for the present Academy building, made possible by the gift of Matthew Laflin (see page 69).

What is a Naturalist? A Study in Natural History

KARL P. SCHMIDT[1]

2. ON READING BOOKS OF TRAVEL BY NATURALISTS

To those of us who work in museums it seems a self-evident truth that a biologist becomes a naturalist when he travels; if the reader wants an amplification of this statement, and wishes to gain an insight into what a naturalist is and does, he need only read a selection of books of travel by naturalists. Museums are constantly faced with the question as to how to become a naturalist; and though we are not unmindful of Agassiz' recommendation to *study nature, not books,* the recommendation of a list of books in this field of literature has become one of our stock answers to such inquiries. That it is a "field of literature" is shown by its current acceptance as a special category of books by an equally ill-defined human group, the book collectors; I may name F. M. Gaige, Director of the Museum of Zoology at the University of Michigan, for example, who collects books in which the word *naturalist* appears in the title, a convenient definition that has been employed by others also. Such a limitation proves, however, to be a most artificial one, since it excludes not only Wallace's *Malay Archipelago,* but even, if strictly interpreted, Darwin's *Naturalist's Voyage around the World,*[2] and Darwin's book is taken by most as the prototype of this class of writings. No arbitrary definition is useful; the writer includes in his list books of travel by biologists and by students of biology, and accounts by collectors of biological materials of their work in the field, and even this broad definition must sometimes be loosely interpreted. We may obviously include certain volumes of descriptive essays by authors who have in one way or another gained a reputation as naturalists. Such descriptions are especially conspicuous when they deal with the natural history of tropical regions, which so unfailingly catch the imagination of both would-be naturalist and naturalist.

The list of works of this kind that have acquired a truly general reputation as classics is small. Everyman's Library, for example, includes with its considerable list of books of travel only Darwin, Bates, Belt, and Waterton to represent this group. These are quite insufficient to give an adequate view of the scope and variety of travels by naturalists. It is a tribute to the influence of Darwin's work that it should

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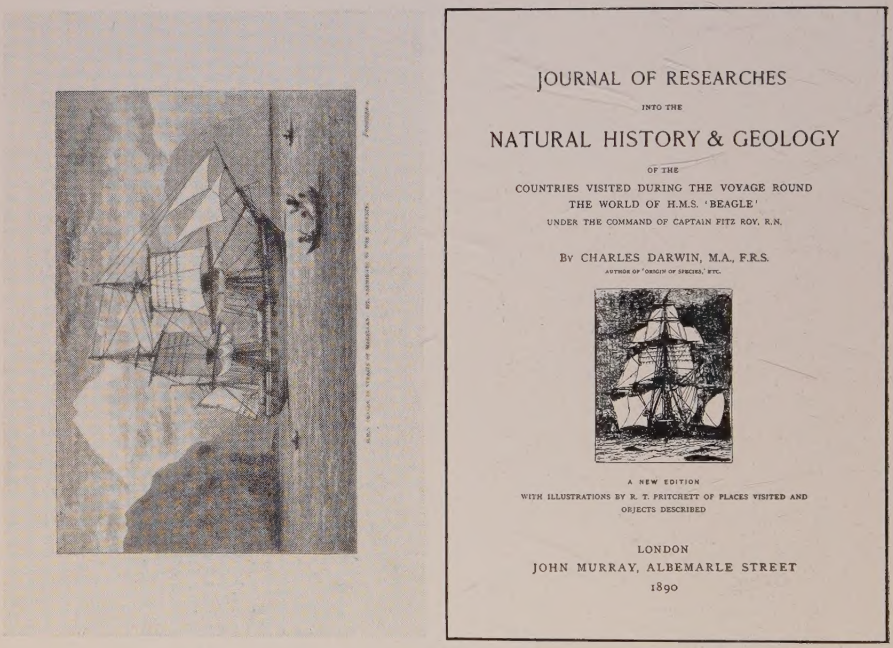
[1]Chief Curator of Zoology, Field Museum of Chicago.

[2]The title of this work is actually "Journal of Researches into the Natural History and Geology of the Countries visited by H.M.S. Beagle round the World under the command of Captain FitzRoy, R.N." (In numerous reprinted editions, e.g., 1890, . . . A new edition with illustrations by R. T. Pritchett of places visited and objects described. Murray, London, xvi+538 p., 102 fig., 2 maps.).

have passed into the current vocabulary of scientists as *the* "Naturalist's Voyage." It may head our list. While it is possible that one should be a naturalist to appreciate it, it is precisely by reading such books that many persons have been stimulated to become naturalists. Darwin's fresh account of the novel animal life of the plains of South America; the glimpses of the gauchos and of the Indian wars; the discovery of



JOURNAL OF RESEARCHES

INTO THE

NATURAL HISTORY & GEOLOGY

OF THE

COUNTRIES VISITED DURING THE VOYAGE ROUND THE WORLD OF H.M.S. 'BEAGLE'

UNDER THE COMMAND OF CAPTAIN FITZ ROY, R.N.

By CHARLES DARWIN, M.A., F.R.S.

AUTHOR OF 'ORIGIN OF SPECIES,' ETC.

A NEW EDITION

WITH ILLUSTRATIONS BY R. T. PRITCHETT OF PLACES VISITED AND OBJECTS DESCRIBED

LONDON

JOHN MURRAY, ALBEMARLE STREET

1890

Title page and frontispiece of one of the many editions of Darwin's "Journal."

gigantic fossil animals in the Patagonian cliffs; the account of the animals of the Galapagos Islands, with their historic influence on his thinking; the view of the coral-fringed South Sea Islands; all these elements combine into a work classic in the best sense, fresh for every new generation. In recent years the journals kept by Darwin on the famous voyage have been made available in their original form.[3] Darwin derived his most important stimulus for scientific observations from the explorations and writings of Alexander von Humboldt, who will be mentioned below.

[3]Barlow, Nora [Editor], 1933. Diary of the voyage of H.M.S. Beagle. Cambridge University Press, Cambridge, xxx+451 p.

It is most appropriate that the second work to be set on every naturalist's bookshelf is *The Malay Archipelago*[4] by Alfred Russell Wallace. Wallace's career is closely linked with that of Darwin, and his share in *The Origin of Species* grew out of his observations in the East Indies as Darwin's grew from his notebooks begun on the voyage of the Beagle. Wallace's work, if of slightly less historic importance, is even more readable.

The "Malay Archipelago" is a running account of Wallace's indefatigable specimen collecting in the romantically fascinating East Indies. It affords an invaluable picture of the vast tropical islands of Sumatra

THE

MALAY ARCHIPELAGO:

THE LAND OF THE

ORANG-UTAN, AND THE BIRD OF PARADISE.

A NARRATIVE OF TRAVEL,

WITH STUDIES OF MAN AND NATURE.

BY

ALFRED RUSSEL WALLACE,

AUTHOR OF

"TRAVELS ON THE AMAZON AND RIO NEGRO," "PALM TREES OF THE AMAZON," ETC.

IN TWO VOLS.—VOL. I.

London:

MACMILLAN AND CO.

1869.

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Title page and frontispiece of *The Malay Archipelago*.

and Borneo, of the Lesser Sunda Islands, of Celebes and the Spice Islands and of New Guinea and its adjacent islands. In Borneo, Wallace hunted the orang. In Sumatra he was occupied with the protective resemblances of butterflies, collected such rarities as the flying lemur,

[4]Wallace, Alfred Russel, 1869. The Malay Archipelago; the land of the orang-utan, and the bird-of-paradise. A narrative of travel, with studies of man and nature. Macmillan and Co., London, 2 vol., xxiv+478+524 p., 51 illus., 9 maps.

and observed the all but incredible nesting habits of the hornbill. In Celebes he describes the maleo, perhaps the most remarkable of the "brush turkeys," the large ground-dwelling birds that do not brood their eggs, but usually place them in heaps of fermenting trash. The maleo deposits its eggs in the black volcanic sands, and, as in its relatives, the young hatch almost fully feathered from their phenomenally large eggs. For the New Guinean section of the book there is the romance of the birds of paradise, to name only one of the most fascinating sections. The description of Waigeu Island, with its unique topography and distinctive animal life, forms a separate chapter. The narrative of travel, interspersed with general accounts of the chief zoological features of the islands visited, reflects not only an unforgettable picture of the wild Malay islands, but Wallace's varied interests and noble character.

It has been the writer's inestimable privilege to follow in the footsteps of Darwin and to see at first hand the extraordinary animal communities of the desert islands of the Galapagos, the flower-starred plains of Uruguay, and the imposing peak of Tahiti; and, after collecting at Wallace's old station at Doré Bay on the great dragon's head peninsula of New Guinea, to hunt the red bird-of-paradise on Waigeu Island, and to watch the butterfly-like flying lizards of Celebes glide from tree to tree. Perhaps he may be forgiven his love for *The Journal of Researches* and *The Malay Archipelago*.

The reader who has been charmed with Wallace's labors and adventures in the Orient learns with interest of his earlier travels in South America. His *Travels on the Amazon and Rio Negro*,[5] published in 1854, resulted from the zoological collecting trip undertaken jointly with H. W. Bates in 1848. Wallace and Bates parted company after a year, and the popular books which are perhaps the most permanent result of their travels are extremely different in content. It is curious that Wallace's South American book should be so much less known than *The Malay Archipelago*. In it one learns the name of a great and all too little known traveller in Brazil, Natterer, whose collections of animals and plants, made in the course of seventeen years of Brazilian wanderings, are preserved in the Museum of Natural History of Vienna. Wallace's accounts of the manatee and of the cock-of-the-rock may be mentioned. He was constantly observant of the social conditions in the tropical regions which were so novel to him. His account of the Indian boat builders on the upper Rio Negro, who build excellent ships entirely from tradition, is of extraordinary interest. Finally, the story of the fire on shipboard en route to England, the calamitous loss of his collections, and the rescue of a single parrot by the leaking boats in which

[5]Wallace, Alfred Russel, 1854. A narrative of travels on the Amazon and Rio Negro, with an account of the native tribes, and observations on the climate, geology, and natural history of the Amazon Valley. Reeve and Co., London, viii+541 p., 1 map., 8 pl.

passengers and crew took refuge, is one of the most remarkable in the history of naturalists' adventures.

Before closing the account of Wallace's books on travel, a digression is necessary to mention his *Island Life,*[6] which embodies in semi-popular form much of his mature knowledge of animal distribution, the subject which he took as his life work. Since it is precisely *the distribution of animals* that emerges as the common denominator of interest in the travels by naturalists, this book becomes one of the basic recommendations of the present essay. Wallace's larger work, *The Geographic Distribution of Animals,* is unfortunately out of date by reason of advances in our knowledge of the classification of animals; but *Island Life* retains its usefulness as an introduction to the study of animal distribution (or zoogeography), though it is now itself much in need of revision. This general subject is in fact the major field of enquiry in the kind of zoological research carried on in modern museums. It has fallen into some disrepute with the rise in importance of the more experimental branches of biology; but with the rise of *ecology,* which considers the interrelation of animals and plants and their environments, animal and plant distribution, and natural history (which is only an old name for amateur ecology) are due for widespread and active revival. A recent popular book,[7] recounting the work of a zoological expedition in the tropics, speaks slightingly of the importance of collecting expeditions (even mentioning Wallace by name!), as if the need for studies on animal distribution were a thing of the past, and as if intelligent collectors like Wallace were not also ecologists. Those of us who are engaged in research in museums are aware of the fact that so far as concerns the geographical distribution of animals, the whole framework of the science remains to be filled out, with zoological explorations of fascinating interest remaining to be accomplished both at home and abroad. I therefore venture to recommend also—as the most comprehensive introduction to this subject available—*Ecological Animal Geography.*[8]

Wallace's companion on the voyage to South America, Henry W. Bates, stayed seven years longer; his eleven years on the Amazon were uneventful enough so far as adventure in the ordinary sense is concerned; of the naturalist's adventures in adding novel creatures to his experience there were some eight thousand. Bates' name is well known to modern

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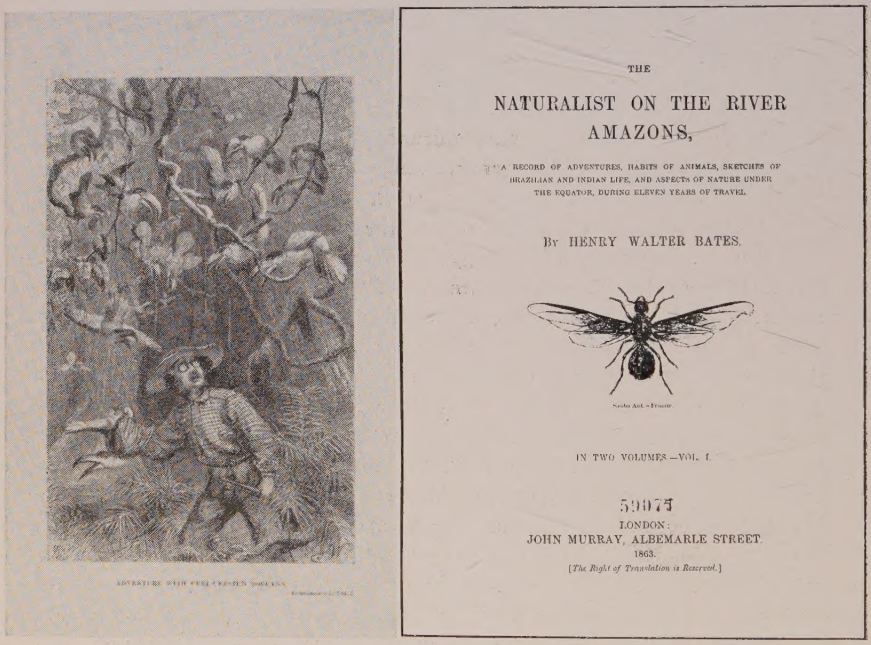
[6]Wallace, Alfred Russel, 1895. Island life or the phenomena and cause of insular faunas and floras including a revision and attempted solution of the problem of geological climates. Macmillan and Co., 2nd edition, London, xx+563, 26 maps and diagrams.

[7]Sanderson, Ivan T., 1937. Animal Treasure. Viking Press, New York, 325 p., 32 illus.

[8]Hesse, Richard, Allee, Warder Clyde, and Schmidt, Karl Patterson, 1937. Ecological animal geography. J. Wiley and Sons, New York, xiv+597 p., 135 fig.

biologists for his extremely interesting observations on mimicry among butterflies. He found butterflies superficially almost indistinguishable, but actually belonging to very distinct families. As some of the brightly colored models belonged to groups with a strong disagreeable scent, he explained their bright coloration as useful to the species in warning off enemies; and explained the resemblance of the mimics as due to the



THE

NATURALIST ON THE RIVER AMAZONS,

A RECORD OF ADVENTURES, HABITS OF ANIMALS, SKETCHES OF BRAZILIAN AND INDIAN LIFE, AND ASPECTS OF NATURE UNDER THE EQUATOR, DURING ELEVEN YEARS OF TRAVEL.

By HENRY WALTER BATES.

IN TWO VOLUMES.—VOL. I.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1863.
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Title page and frontispiece of "The Naturalist on the Amazons."

value of resemblance to the protected form to *their* species. These observations have given rise to much subsequent observation and description. Some modern biologists deny that such colorations are useful to the species, and hence that they could not have arisen through the operation of natural selection. The more advanced biological opinion seems to have returned to the opinion that there is a sufficient bioligical advantage in both warning and obliterative coloration, and in mimicry with them, to warrant the conclusion that they have arisen, as Bates and Darwin thought, through the operation of natural selection. The matter is not yet settled; but the fact that it is so lively a topic in current ecological discussions reflects some importance on naturalist Bates.

The Naturalist on the Amazons,[9] embodying the experience and observations of Bates' eleven years stay on the greatest of tropical rivers, was published in 1863. It was written at the insistence of Charles Darwin; our first three classics of travel by naturalists—by Darwin, Wallace, and Bates—thus prove to be an interlocking triad, linked not only by community of interest on the part of their authors, but even more deeply by their close personal relations.

Bates was fortunate in the editions of his book. The first edition in two volumes has become something of a rarity, though listed currently at about $10.00. Edward Clodd, an enthusiastic disciple of the great English evolutionists, prepared a fine edition, with excellent colored plates illustrating Bates' discoveries of mimicry in butterflies, with a portrait of Bates, and a sympathetic memoir on his life; this edition, while out of print, is fortunately usually available secondhand at a moderate price. It has been mentioned above that the *Naturalist on the Amazons* is also currently available in Everyman's Library.

There is a work somewhat older than the generation of the evolutionists, well known to English readers and by reputation at least belonging with our list of classics of travel by naturalists. It is Waterton's *Wanderings in South America,*[10] first published in 1828, and much reprinted. Its importance lies in the fact that it was long a contributing factor in directing the interest of English naturalists to the South American tropics, and its popularity is due to the freshness of its first hand descriptions of the author's adventures and of animal life in the tropics. Its popularity with the general public is shown by the fine MacMillan edition edited by J. G. Wood; and Charles Livingston Bull's series of colored plates, illustrating an American edition, is a further tribute to its influence on naturalists. The Everyman's Library edition is the only one I find in print.

The Naturalist in Nicaragua,[11] by Thomas Belt, associated with Waterton and Darwin and Bates in Everyman's list, proves to be an extremely worthy companion to the works thus far described. Belt was a geologist and mining engineer of note, and brought with him to Nicaragua long experience as a traveler; he had been an attentive reader of

[9]Bates, Henry Walter, 1863. The naturalist on the River Amazon, a record of adventures, habits of animals, sketches of Brazilian and Indian life, and aspects of nature under the Equator, during eleven years of travel. 2 vol., viii+351 p., 18 illus., 1 map., vi+423 p., 24 illus. *Idem.* 1892. With a memoir of the author by Edward Clodd. Appleton and Co., New York, lxxxix+395 p., 44 illus., 1 map.

[10]Waterton, Charles, 1825. Wanderings in South America, the north-west of the United States, and the Antilles, in the years 1812, 1816, 1820, and 1824. With original instructions for the perfect preservation of birds, etc., for cabinets of natural history. J. Mawman, London, vii+326 p., 1 pl. [Numerous editions.]

[11]Belt, Thomas, 1874. The naturalist in Nicaragua: a narrative of a residence at the gold mines of Chontales; journeys in the savannahs and forests. With observations on animals and plants in reference to the theory of evolution of living forms. John Murray, London, xvi+403 p., 26 fig., 1 map.

Bates, and the equipment thus brought to bear on the Central American region results in a most notable book of travel and natural history. Some of Belt's discoveries in insect mimicry are extremely convincing. His observations on the association of ants with the bull-horn acacia are classic. His most important contribution to biology is his solution of the extremely remarkable fact that the smaller fresh-water animals, in

WANDERINGS IN
SOUTH AMERICA

THE NORTH-WEST OF THE UNITED STATES
AND THE ANTILLES,
IN THE YEARS 1812, 1816, 1820, & 1824
With Original Instructions for the perfect preservation of Birds, etc.
for Cabinets of Natural History

BY
CHARLES WATERTON

Including a Memoir of the Author
BY
NORMAN MOORE, M.D.

With Illustrations and a Brief Introduction
BY
CHARLES LIVINGSTON BULL

NEW YORK
STURGIS & WALTON
COMPANY
1909

Title page and frontispiece of an American edition of Waterton's "Wanderings."

spite of the isolation of the lakes and rivers in which they live, tend to be world-wide in their distribution, whereas land animals promptly develop distinct species under isolation of any kind. The explanation lies in the shortness of the geological life of bodies of fresh-water; the time available for evolution in lakes and ponds is for the most part too short to develop distinct new forms; while in still more evanescent pools, no life can exist save that which is able to survive drying in some kind of resting state, and, frequently, transport as dust through the air. Belt's work is to be had in a second edition, frequently available second hand, and in Everyman's Library. The first edition is relatively rare and commands a modest premium.

We may well digress from our list of classics for some more general considerations relative to the naturalist's profession. Bates and Wallace were private persons who maintained themselves first by the sale of their collections and later by the sale of their writings. (Bates, after his return to England, filled a useful rôle as Assistant Secretary of the Royal Geographic Society). Belt was a geologist and Waterton a planter and English country gentleman. Darwin was appointed to the official position of naturalist to a great exploring expedition. Darwin's rôle is much closer to the modern naturalist's kind of travel, which is usually in some form of exploration or of investigation for an institution or foundation. The word "expedition" has become something to conjure

THE

NATURALIST IN NICARAGUA:

A NARRATIVE OF

A RESIDENCE AT THE GOLD MINES OF CHONTALES;
JOURNEYS IN THE SAVANNAHS AND FORESTS.

WITH

OBSERVATIONS ON ANIMALS AND PLANTS IN REFERENCE TO THE THEORY OF EVOLUTION OF LIVING FORMS.

By THOMAS BELT, F.G.S.,

AUTHOR OF "MINERAL VEINS," "THE GLACIAL PERIOD IN NORTH AMERICA" ETC., ETC.

WITH MAP AND ILLUSTRATIONS

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1874

[The right of Translation is reserved]

Title page and frontispiece of *The Naturalist in Nicaragua*.

with in the minds of the modern public; but it is doubtful whether there is much popular understanding as to what a modern zoological and botanical collecting expedition is or does.

Many of the great early voyages made primarily for geographic exploration carried a naturalist with them. Their technical reports form an important and integral part of the library of any museum of natural history. The voyage of the Beagle may be taken as an example. An

official narrative and the scientific reports by Darwin and various specialists occupy six octavo volumes and one fat quarto. Much of the technical report is based on specimens collected in the field and brought home for detailed study and for comparison with existing collections.

Voyages with scientific intent became something of a fashion in the eighteenth century; those of Cook, with their far reaching geographic importance, were notable. The trend toward exploration in the interests of other sciences than geography received its first great impetus from the enthusiasm for descriptive zoology and botany that developed from Linnaeus' invention of the simple and satisfactory binomial Latin nomenclature for the kinds of animals and plants. Modern descriptive biology dates from Linnaeus' "Systema Naturae," of which the edition of 1753 is taken as the beginning of nomenclature for plants and the tenth edition, of 1758, for animals. The tenth edition is available in facsimile reprint; an original is occasionally available at about $100.00.

Two of Linnaeus' collectors and pupils have left books of travel, both of them of great interest, both originally written in Swedish. Frederick Hasselquist's travels in the Near East brought a rich store of new species of animals to Linnaeus' descriptive pen, and Hasselquist's record of his travels,[12] while full of the curious stock of misinformation that forms so much of native lore everywhere, is a fresh and vivid account of places of interest (such as Jerusalem) and of familiar animals (such as the crocodile of the Nile). Peter Kalm's travels in North America were mainly in the interests of plant collecting. His book has recently had a scholarly American edition[13] in recognition of the value of a naturalist's observation of the "American Scene" in 1750.

The travels and resulting writings of Alexander von Humboldt gave a second great impetus to scientific travel. His travels in tropical America between the years 1799 and 1804, in company with the French botanist Aimé Bonpland, were undertaken after years of exacting preparation for the rôle of scientific traveler. The results of his observations and collections, and subsequent comparative study, are comprised in thirty tall volumes. These are now scientifically out of date (except for their combined historic interest and importance); but their influence and that of Humboldt persist to this day in the conduct of museum expeditions and of programs of investigation with a geographic aspect,

[12]Hasselquist, Frederick, 1766. Voyages and travels in the Levant; in the years 1749, 50, 51, 52. Containing observations on natural history, physick, agriculture, and commerce: particularly on the Holy Land, and the natural history of the Scriptures. [English translation anonymous.] Davis and Reymers, London, viii+456 p., 1 map.

[13]Benson, Adolph B., 1937, The America of 1750. Peter Kalm's travels in North America. The English version of 1770 revised from the original Swedish and edited . . . . with a translation of new material from Kalm's diary notes. Wilson-Erickson Inc., New York, 2 vol., xviii+797 p., 19 pl.

whether of the oceans or of islands and continents. Fortunately, such exploratory expeditions, staffed by technical scientists, are likely to have a popular or semipopular by-product in books of travel written by those of their staff who have the broader viewpoint of the naturalist. Of Humboldt's voluminous writings, the best work for the modern reader is perhaps his *Ansichten der Natur*,[14] and, in the same edition, the three volumes of his *Travels*.[15]

One of the most important developments of scientific exploration in the last century lay in the development of the science of oceanography, the study of the sea. The study of the depths of the sea, in particular, brought to light living relicts of groups of types of animals that flourished in past ages, discovered the astonishing luminescence of deep sea creatures, and made known the most bizarre of crustaceans and fishes. The early development of oceanography culminated in what may well have been the most important scientific expedition of modern times, the four year voyage of the British oceanographic survey ship *Challenger*. The scientific results of the Challenger Expedition fill a whole shelf of volumes, and in their scholarly text and magnificent illustration form a mine of information to which writers on the science of the sea must constantly return. Numerous books of travel of a more general nature were produced by various members of the staff including first the imposing narrative of the voyage by various members of the staff[16] and the general account of the Atlantic by Sir Charles Wyville Thomson, the director.[17] A readable general account of the long voyage is to be found in the volume by H. N. Moseley,[18] and there are several others. American studies of the life of the sea may well be introduced by Alexander Agassiz' *Three Cruises of the Blake*.[19]

[14]Humboldt, Alexander von, 1850. Views of nature: or contemplation on the sublime phenomena of creation; with scientific illustrations. Translated from the German by E. C. Otté and Henry G. Bohn. With a frontispiece from a sketch by the author, a facsimile of his handwriting, and a comprehensive Index. H. G. Bohn, London, xxx+452 p., 2 pl.

[15]—1884. Personal narrative of travels to the equinoctial regions of America, during the years 1799-1804. By Alexander von Humboldt and Aimé Bonpland. Written in French by Alexander von Humboldt: translated and edited by Thomasina Ross. Bell and Sons, London, 3 vol., xxii+505, vi+521, and vi+442 p. [Both titles in Bohn's Scientific Library.]

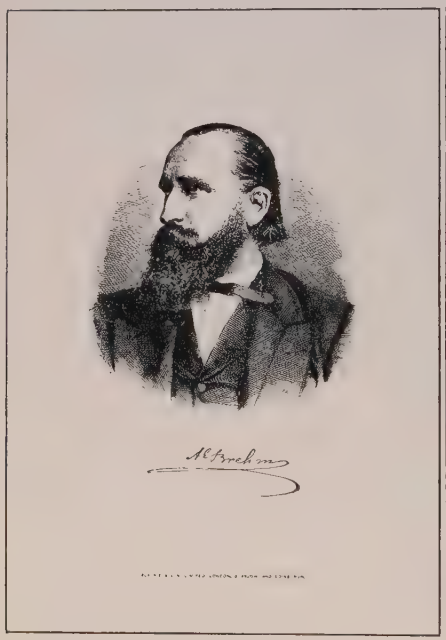
[16]Tizard, T. H., Moseley, H. N., Buchanan, J. Y., and Murray, John, 1885. Report of the scientific results of the voyage of H.M.S. Challenger during the years 1873-76 . . . Narrative. vol. 1, in two parts, liv+viii+1110 p., col. pl. A-O, pl. 1-35, fig. 1-340, 24 tailpiece cuts, 22 diagrams, 44 maps. [The Narrative, vol. 2, consists of more technical reports.]

[17]Thompson, C. Wyville, 1878. The Atlantic a preliminary account of the general results of the exploring voyage of H.M.S. "Challenger" during the year 1873 and the early part of the year 1876. Harper and Brothers, New York, 2 vol., xx+391, viii+340 p., frontisp., 110 fig., pl. 1-14 and 66 fig., pl. 15-42, 1 map.

[18]Moseley, H. N., 1879. Notes by a naturalist on the "Challenger," being an account of various observations made during the voyage of H.M.S. "Challenger" round the world, in the years 1872-1876, under the commands of Capt. Sir G. S. Nares, R.N., K.C.B., F.R.S., and Capt. F. T. Thomson, R.N. Macmillan and Co., London, xvi+606 p., 83 fig., 2 pl., 1 map.

[19]Agassiz, Alexander, 1888. A contribution to American Thallassography. Three cruises of the United States Coast and Geodetic Survey steamer "Blake" in the Gulf of Mexico, in the Caribbean Sea, and along the Atlantic coast of the United States, from 1877 to 1880. 2 vol., xxii+314, ii+220 p., 550 fig.

The space limits of the present series of essays on books by naturalist-travellers cut short the series of titles of the eighteen-eighties and nineties, many of which would qualify for our list by readability or scientific or even literary importance. A concluding title may serve to tie together some of our several threads of interest, since its author, the German naturalist Alfred Brehm, may be said to have done more than



FROM
NORTH POLE TO EQUATOR
STUDIES OF WILD LIFE AND SCENES IN MANY LANDS
BY THE NATURALIST-TRAVELLER
ALFRED EDMUND BREHM
TRANSLATED FROM THE GERMAN BY
MARGARET R. THOMSON
EDITED BY
J. ARTHUR THOMSON, M.A., F.R.S.E.
WITH EIGHTY-THREE ILLUSTRATIONS FROM ORIGINAL DRAWINGS
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Title page and frontispiece of *From North Pole to Equator*.

any other single person to make the general fund of descriptive knowledge of the animal kingdom available to the general public. Brehm's "Tierleben," in six volumes in the first edition of 1864 to 1869, has become a classic, improved and expanded in successive editions; it is now in its fourth edition, in fourteen volumes. As the most comprehensive account of the habits of animals, and with its good figures and photographs of the animal life of the world, the "Tierleben" continues to be indispensable to the professional zoologist. The woodcut illustrations of the original Brehm formed the basis of most popular natural histories in English, such as Wood's *Animate Creation* (with numerous modified editions), the American *Riverside Natural History,* Lydekker's *Royal Natural History,* et cetera. Thus Brehm's illustrations are fa-

miliar to a host who never heard of the original work. The background of Brehm's interest is to be found in his travels as an observer and collector of birds and mammals, which took him to the far northern rookeries of sea-birds, to the steppes and forests of Siberia, and to various parts of Africa.

The attractive English edition of Brehm's *From North Pole to Equator*[20] is provided with an introductory essay by J. Arthur Thomson, himself a naturalist and author of natural histories. This is entitled "Brehm's place among naturalist-travellers" and thus serves as an excellent precedent for the present paper.

This is the second of a series of three articles by Mr. Schmidt. The third, to appear in the next issue, will discuss books by naturalist-travellers of the 20th Century. A reprint of all three, under one cover, will be available in December, price twenty-five cents.—Ed.

The meadowlark is gaily dressed
In a black cravat and a yellow vest;
But if you think this bird is vain
Please mark his coat, how very plain;
So plain that if you stand behind him
You'll find it difficult to find him.

—Edward R. Ford
Reprinted from *The Audubon Bulletin.*

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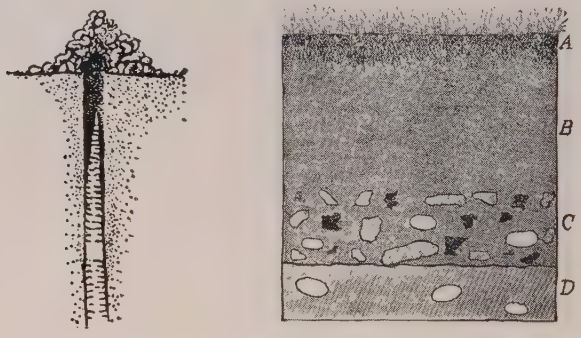
[20]Brehm, Alfred Edmund, 1896. From North Pole to Equator studies of wild life and scenes in many lands by the naturalist-traveller Alfred Edmund Brehm, author of "Bird-Life," "Tierleben," etc. etc. Translated from the German by Margaret R. Thomson. Edited by J. Arthur Thomson, M. A., F. R. S. E. Blackie and Son, London, xxxi+592 p., 83 fig.

Earthworms and Their Neighbors

T. H. Eaton, Jr.

More than a million earthworms may live in one acre of good farm land. Just as many are likely to be found in fertile woodlots. If you dig up a square foot of such soil you may uncover from ten to fifty large and small worms.

What are they doing there besides waiting for a chance to go fishing? Most of the time they are making tunnels, eating the soft soil ahead of them and passing it out behind in the form of castings which you may see on the surface at the entrance to their holes. In this way they let air and water into the ground and keep it loosened, which helps growth of plant roots. At night they like to reach out and feel around for some soft dead leaves or decaying blades of grass. They take hold and



Left: Burrow and castings of an earthworm (after Walton). From Hegner's *College Zoology*, 3rd ed.

Right: Section of top soil: earthworms have covered over stones (C) with fine soil (A, B) (after Darwin). From Hegner's *College Zoology*, 5th ed.

Both figures reprinted by permission of the Macmillan Company.

pull these into the ground, all the way or part way. So in woodlots where worms are plentiful you will see little clusters of last year's leaves around the holes, partly eaten by worms.

What good does this do?

When grass and weeds die, and when leaves fall in the woods, they bring down to the ground the elements and compounds that were stored up in those growing plants. Over two thousand pounds of dry leaves fall each year on an average acre of northern hardwood forests. Earthworms help convert these dead leaves to the well mixed mull humus where the same food will be available at once for new plants to use.

One hundred and two years ago Darwin showed that earthworms bring up enough soil to the surface of a pasture to make a layer half

an inch deep every year. In a few years stones and bricks lying on the ground were buried, leaving a smooth surface of soil. This, he said, is going on wherever earthworms are common, although erosion by wind or water may interfere. So, when they are left alone, earthworms not only help fertilize the soil and improve its texture but they plow it, carrying it up little by little.

Does this mean that everybody who runs a farm should rush out and introduce earthworms wherever he thinks he has less than a million of them to the acre? That might be a good idea, but it is hardly practical or necessary. Worms will get along very well if they have a good surface cover, either of crops or pasture weeds or forest, so that every year some new plant material comes their way. The other requirement is water, which will be adequate if vegetation or litter is present. Only on soil left bare and dry for weeks at a time is the worm population likely to disappear.

Now worms are among the largest animals living in the soil, but they are not the commonest. A whole army of little fellows, barely big enough to see with the naked eye, or even a great deal smaller than that, lives in every square foot of fertile soil.

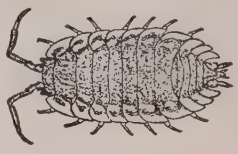
Mites, for instance. Ticks and the so-called "red spiders" are special kinds of mites, but there are many other kinds, much more useful and much more abundant. In a layer of surface soil one inch deep and a foot square, taken anywhere in the woods, the number of mites living there may run from two thousand to more than seven thousand. If human beings were the size of these mites we could find the whole population of Chicago in a space 22 feet square, with plenty of room to spare!

It is a curious fact that in woods where the humus layer consists of rich black organic matter formed by dead leaves and tangled roots without much mineral soil in it, mites are commonest but earthworms are rare. Where earthworms are abundant, bringing mineral soil to the surface, there will be fewer mites—hundreds to the square foot, perhaps—but not the maximum numbers. And on cultivated soil exposed to sun and air directly the number is still smaller.

What do these little animals live on? We know that a few, less than a fifth of them, run around hunting for other mites and tiny insects and worms to eat. But the great majority live on some sort of dead plant food. If we pick up a bit of soil containing a tangle of thread-like roots, once alive but now dead, the microscope shows that mites are slowly eating away these decaying rootlets. We know that they feed on fallen leaves, if the leaves are damp enough and softened enough by bacteria and molds. In the case of spruce litter, at least three kinds of mites spend their lives hollowing out the soft decayed needles.

Second only to the mites in quantity come the springtails, a group of little insects that do just what their name says, spring by their tails. They have no wings and are very tiny, but just try to catch one. The short tail folded under it suddenly snaps out and the insect lands several inches away. In winter some of these hop around on melting snow and are called snow fleas, but most of them live right in the soil, under dead leaves or trash on the ground. With springtails, too, the population often runs into hundreds per square foot, millions to the acre. Their food is the same as with most of the mites, decaying leaves, rotting wood and the like. Little by little they help to break down the great store of natural fertilizer that comes each year in the falling leaves.

Then there are other creatures that everybody knows, the sowbugs and pillbugs. Whenever you turn over a stick on the ground you are likely to notice these gray or brown oval animals running away or else rolling into a ball and hoping you won't see them. It is easy to test their appetites by offering them different kinds of food, after mak-



Left: Springtail (Collembola). Courtesy of General Biological Supply House, Inc., Chicago.

Right: Sow bug *(Oniscus asellus)*. From Hegner's *College Zoology*, 5th ed., by permission of the Macmillan Company.

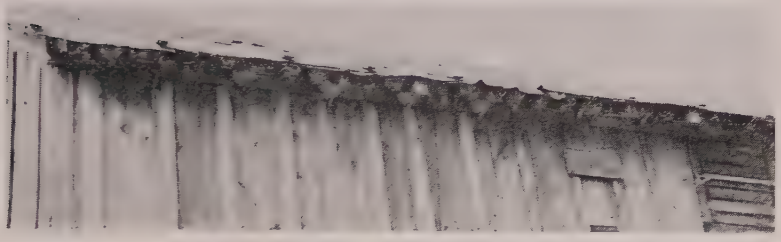
ing them feel at home in a jar of moist earth. Of half a dozen kinds of dead leaves they seem to prefer sugar maple—perhaps it's the maple flavor! But take away leaves and they'll eat dirt. Take away dirt and they'll eat dead wood, if it is damp and soft. In other words they will try anything once, and often twice. There is reason to believe they have almost as much value in breaking down dead leaf litter as the earthworms have.

We have only begun on the story of the animals that live in the soil. The list is long and constantly growing as we find out more about them. The next time you see a millipede or "thousand-legger" don't shudder just because it has more legs than you have. Stop and look it over. It is absolutely harmless and indeed rather attractive. If you will offer it a home in a jar or a can containing a little dirt you will find out something about its value to nature. For here is another creature that eats practically anything, dead leaves, soft pieces of bark lying on the ground, a bit of potato or apple, or, if you like, mud.

And still we have said nothing about many other animals, such as ants, snails, white grubs, wireworms, beetles and so on, which you find

(Continued on page 72.)

Notes from the Field



An Old Colony of Cliff Swallows

Old colonies of cliff swallows like the one at San Juan Capistrano, which allegedly dates back to the arrival of the Franciscan Monks in California in the sixteenth century, are well known. The one I wish to describe is in the metropolitan district of Chicago, located on the Mulderink farm, between Mt. Hope Cemetery and the town of Blue Island, which borders it on two sides, the third side being more or less open country with relatively few houses nearby.

According to John Mulderink—six feet tall, barrel chested and stoop shouldered, 75 years old November, 1942, who says that "work never hurt anybody" and looks as though he spoke from experience—his family moved to this farm in 1868 when he was about six months old. They built a combination house and barn which was immediately used by the cliff swallows. Of course this was told him by his parents, but he says that he remembers the swallows as early as he remembers anything.

The family subsequently built a separate better house, using the original building entirely as a barn. There are now four barn and shed buildings on the premises (not counting the corncrib), unpainted, and all used by the swallows, for whose convenience Mr. Mulderink has put up many little supporting brackets. When I suggested that nailing a little strip along under the eaves would be easier, he answered that the swallows seem to like the brackets well enough.

Next door to the farm is a clay hole owned and used by the Illinois Brick Company, which does not collect anything from the swallows for the use of their material. This company also now owns the farm property, and while adjoining property is being prepared for possible industrial use, the farm is still being operated as such.

This spring all the old nests were knocked down by Mr. Mulderink to keep the swallows from preempting them. He has done this before and it seems to work out all right. Without counting about a dozen nests that were damaged by a recent heavy rain, there were on the four buildings altogether 125 new nests apparently in active service. Thirty-four of these faced south and sixty-eight east, inward on the house yard; twenty-three faced west, which is outward toward the cattle yard and open country. One young bird at the time of our visit was wedged between two of the nests and had to be rescued. He was about ready to fly and had wedged himself in so tightly that it was quite a job to get him out without injury, and naturally any cooperation on his part was in reverse.

The parent birds, were frequently both at the nest at the same time, made

(Continued on page 72.

Behavior of a Hummingbird

My friend, J. M. Hollister of Schenectady, New York, writes of a hummingbird which he caught in a butterfly-net, at Gainesville, Florida last winter. Such a capture is not especially unusual but the bird's behavior, as described by my correspondent, is worthy of record. "He was resting on a vertical wall of an entrance porch to the hotel. . . . The porch was open on three sides. . . . The position was like a chimney swift's—tail feathers spread and feet clinging to . . . the wall, *and head swaying.*" (The italics are mine.)

In a later communication Mr. Hollister says, "The bird did not seem to be injured and it certainly was not hurt when I caught it. . . . I placed the net over it while it was resting on the wall, and when I gently touched its bill with the frame of the net four or five times, it turned and grabbed the netting. I kept it over night releasing it after photographing it. My *guess* (the italics are Mr. Hollister's) is that the bird was bewildered and, perhaps, exhausted from flying, for some time, round and round near the porch ceiling, about 12x15 feet of surface. Incidentally a mockingbird made a dive for the hummer during its flight."

E. R. Ford.

Calendar for Microscopical Work and Collecting

Compiled by J. E. Nielsen, President of State Microscopical Society of Illinois

January	Moss, Fauna connected with moss such as Rhizopods, Infusoria, etc.	Technical microscopy, Fixed material, cultures	Winter plankton, Fungi.	
February	Lichen, Bacteria.	Rocks, Foods, etc.		
March			Diatoms	
April	Plankton, Crustaceae.	Protozoa,		
May			Rhizopods	
June	Botanical and zoological specimens (Insects, flowers, etc.)	Rotifers, Annelids, Echinoderms.	Porifera	Blue-Green Algae, Myxomycetes.
July			Arthropods	
August			Rocks and Minerals	
September	Diatoms, Basidiomycetes.	Plankton	Pollen	
October				
November				
December	Technical Microscopy.	Cultures, Fixed Material.	Bryophytes, Bacteria.	Fungi

Fiftieth Anniversary of Academy Building

Fifty years ago on October 10, 1893, the cornerstone was laid for the present Chicago Academy of Sciences headquarters and museum of natural history in Lincoln Park at Clark and Ogden. The new building, the Matthew Laflin Memorial, dedicated October 31, 1894, was the seventh housing of the offices, museum, and library of the Academy in the thirty-seven years following its founding in 1857.

The Laflin gift of $75,000 bore the following conditions: that the building be fireproof, that it be erected on an appropriate site in Lincoln Park, that the museum be opened to the public without charge, that the plans for the building be approved by the family of the donor, and that the building be started in 1893 and completed in 1894.

The Board of Commissioners of Lincoln Park agreed to designate a plot of ground for this purpose and contributed $25,000 to the expenses of construction.

The Chicago Academy of Sciences' Museum of Natural History has been a public museum since 1869, when, by popular demand, it was opened to the public on Saturdays. Since 1894 it has been open free to the public at all times, this being a provision in Mr. Laflin's gift.

The history of the Academy is not only reflected in the story of its housing, but this factor has had an unusually strong influence in the development and present character of the institution. If adversities are character-builders, the Chicago Academy of Sciences should, indeed, be strong.

In spite of being twice burned out, the Academy enjoyed an initial period of progress and expansion lasting from its founding in 1857 until the financial depression of 1873. In 1866 the museum collections—including many irreplacable type specimens from the collections turned over to the Academy by prominent scientists in its membership and the invaluable natural history and ethnological materials acquired by Robert Kennicott on the Smithsonian expedition to Alaska from 1859 of 1862—were largely destroyed by a fire in the museum rooms rented by the Academy in the Metropolitan Block (on the northwest corner of Randolph and La Salle). This disaster crystallized the trustees' decision to acquire a separate museum building, and six weeks after the fire they purchased a site on Wabash Avenue north of Van Buren Street.

The building erected at this location was, according to a note in the Academy records, "completely fireproof throughout and no expense was spared to guard against another loss by fire." Less than three years later, on October 9, 1871, the Great Chicago Fire left it a pile of rubble. The ironical aspect of this tragedy lies in the fact that there was time for members and officers, gathered at the Academy headquarters by the threat of the advancing fire, to remove the most valuable objects, but they decided the safer course, because of the fireproof construction of this building, was to stack the library and museum records end materials on the floors away from danger of damage by the anticipated heat on the walls.

At the first meeting after the fire, twelve days later, steps were taken to build up the collections anew, and several donations were announced. The following year the same site was rebuilt in not only a museum building but a business block from which the trustees expected a large income

A period of retrogression started with the financial depression of 1873, which eventually resulted in the loss of this property in 1876. As a temporary measure the collections were given exhibition space in the Interstate Exposition building (on the site of the present Art Institute). The tearing down of the exposition building in 1892 sent the Academy's collections into storage. Fortunately several proposals which had been brewing became definite offers during this year, and the acceptance of Mr. Matthew Laflin's offer ended the Academy's housing vicissitudes, assuring it physical security and the opportunity for steady development of its educational activities and services to the public.

Harriet M. Smith.

Museum Activities

Fall Sunday Lectures

The annual fall series of Sunday Afternoon Lectures began November 7 and continues through December 19, 1943. These lectures, as usual, are free to the public, but in order to eliminate confusion and give members of the Academy the benefit of seats reserved in advance, tickets for admission to the lecture hall will continue to be used.

Members of the Academy may reserve tickets either by writing the Academy or telephoning LINcoln 0606 up to noon on the Saturday preceding the lecture, and their tickets will be held for them at the museum office until 3 o'clock, when the lecture begins. All seats in the reserved section not claimed by 3:00 P.M. will be made available to the general public.

General admission tickets will be available only on the day of the lecture, from 1:30 to 3:00 P.M. at the museum. The doors of the auditorium are opened at 2:30 P.M. and closed at 3:00.

Nov. 7: **Fur Animals—A Valuable Natural Resource** (illustrated by motion pictures of beaver), Frank G. Ashbrook, In Charge Fur Resources, U. S. Fish and Wildlife Service.

Nov. 14: **America's Northwest** (Kodachrome motion picture), Norman R. Hallack, Broadview Academy–LaGrange.

Nov. 21: **Young Adventurers in Canada's Canoe Country** (Kodachrome movie), MacKenzie Ward, Photographer, Lecturer—Chicago.

Nov. 28: **Planet Earth, with Observations on the Earth's Crust,** Frank Hancock, D. D., President Burnham Astronomical Society—Chicago.

Dec. 5: **Glacier National Park** (Kodachrome motion picture), Victor H. Sickenger, Photographer—Wilmette.

Dec. 12: **Historic, Pre-historic and Scenic Areas of the Southwest** (Kodachrome stills), Herbert E. Kahler, Acting Supervisor of Historic Sites, National Park Service.

Dec. 19. **Little Known Canyons and Peaks in Southern Utah** (Kodachrome motion picture), Ernest H. Lyons, Jr., Research Chemist, Evanston.

Lobby Exhibits

From July 28 through October 13 an exhibit of both natural color and black and white photographs of birds by Dr. Eliot F. Porter was on display in the Academy building lobby. The photographs in this collection, loaned through the courtesy of the Museum of Modern Art of New York, were made in Illinois, Arizona, and Maine during 1940 and 1941.

Dr. Porter's exacting requirements for an ornithological photograph are: a clear and characteristic portrait of the bird, a technically good photograph, and an emotionally satisfying picture. Nationwide recognition by both ornithologists and camera enthusiasts testifies to his achievement of these standards.

Fur Animals of Illinois—Past and Present, an exhibit of natural skins, processed pelts, and rare "freak" furs, is featured this fall as the lobby display in the Academy's Museum of Natural History.

Dressed skins of fur animals which formerly lived in or are still found in the Chicago area have been loaned the Academy by the Fur Resources section of the Fish and Wildlife Service, United States

Department of the Interior. Freak furs—albinos and other rare color variations—and variously processed pelts (the economic metamorphosis of the lowly rabbit and muskrat) are displayed through the courtesy of Ben E. Nye Company, Chicago fur finishers, and A. Hollander and Son, Inc.

According to Frank G. Ashbrook, national head of Federal fur resources work, who has served as technical consultant for this exhibit, "As the number of furs received from foreign countries diminishes because of war conditions, the American market is becoming more and more dependent on local production. With increased trapping, many species in precarious status are in danger of extermination unless further protected by State laws. No class of wildlife has been more ruthlessly exploited than fur animals, but growing popular interest in conservation of wildlife may well be the basis for the restoration of fur animals to a point approaching their former productive value (when trapping for furs was the incentive for the early exploration of vast areas of North America) if the American supply of furbearers can weather the abnormal wartime drain on this valuable natural resource."

Process Exhibit—Celluloid Leaves

A new exhibit demonstrating the ten main steps in the making of the celluloid leaves used in our habitat groups has been set up in the center table case in the main museum hall.

During the last fifteen years the Preparations Laboratory staff of this institution has played an important role in the development of this relatively new museum technique, which has now largely supplanted the making of wax leaves as habitat group accessories because of the more natural appearance and greater durability of the sheet celluloid replicas.

Dr. Davis Honored

Dr. Nathan Smith Davis, President of the Academy, received the Distinguished Service Medal of the Mississippi Valley Medical Society at its ninth annual meeting, Quincy, Illinois, September 30, 1943. The presentation by the society's president, Dr. Edward M. Myers, included the following citation: "A high type of physician, an able clinician, an accurate investigator, and a writer of syndicated medical advice for the public. While he descends from an illustrious family in medicine, he has earned his own niche in the profession."

Dr. Davis' grandfather, a founder of the American Medical Association, was also a founder of the Chicago Academy of Sciences.

Field Work

During parts of August and September Dr. H. K. Gloyd, with the assistance of W. A. Bevan of Long Beach, California, carried on additional field work in Arizona, chiefly in the vicinity of the Boyce Thompson Southwestern Arboretum at Superior.

Recent Visitors

Professional biologists who have visited the Academy recently include Dr. and Mrs. Frederick H. Test, University of Michigan; Dr. Charles P. Odum, University of Georgia; Charles M. Bogert, American Museum of Natural History, New York; Dr. Robert K. Nabours, Kansas State College, Mahattan; and Percy Viosca, Jr., New Orleans.

Sound Film on Model-Making

A public program of general interest in the field of natural history, sponsored by the State Microscopical Society of Illinois, an Affiliate of the Academy, was presented in the Academy auditorium on Friday evening, October 15. Mr. Kittner of Denoyer-Geppert Company presented the sound film, *How Anatomical Models are Made*, and demonstrated some of the more interesting models produced by his firm.

New Members

The following names have recently been added to our membership rolls:

Sustaining Member: Mr. Max C. Shank, Chicago.

Associate Members: Mr. Joseph Babyar, Mr. Anthony Battaglia, Rev. John B. Murphy, and Mr. and Mrs. Halsey Steins—all of Chicago; Miss Louise Whiteman, Evanston; Mr. Donald M. Cox, La Grange; Dr. D. W. Mac Corquodale, Highland Park; Mr. C. N. Timmons, Sterling, Ill.; Dr. Fred R. Cagle, Carbondale, Ill., Mr. Arthur F. Oldham, Gary, Ind.; Mr. Rutherford Platt, New York, N. Y.

The officers and members of the Academy are happy to welcome these new members—many of them old friends from our lecture audiences and affiliated societies.

(Continued from page 67.)

frequent trips, and usually remained only a few seconds, apparently carrying food to only one offspring at a time. Most of the fledglings as seen at the nest entrance had white throats, streaked with black, and the same markings on the forehead. The rescued juvenile had a dark throat, as have adults, with a blurred white on the forehead.

This is the only colony I know of in the Chicago area at present. Another about three and a half miles further west was given up several years ago, for reasons I do not know.

Photographs were kindly made for me by Herbert P. Burtch of the Oriental Institute of the University of Chicago, under the disadvantage of bright sunlight and deep shadows under the eaves. Alfred Lewy, M.D.

(Continued from page 66.)

almost anywhere in great quantities. A few of them are well-known pests that must be kept under control.

But almost the entire surface of the earth, except for bare rock and dry sand, is filled with incredible swarms of tiny living animals, that go on about their useful work silently, unseen and without credit. We are realizing only dimly their importance to agriculture and forestry, for we have been slow to study their habits. Theirs is the mechanical labor of chewing up and digesting the enormous contribution presented to the earth every year by the plants that grow on it.

The Naturalist's Book Shelf

Science in Progress

Edited by George A. Baitsell

Yale University Press, New Haven, Conn., 1942. xiv, 322 pages, 112 figures, Index. $3.00.

The third series of lectures or essays on certain phases of science in progress, presents valuable summaries which are worthy of prolonged study. One needs to bring to their perusal a degree of intelligence found usually only among those who have had considerable higher education. Nevertheless, much of the presented material will be of interest to the layman. Such works are a constant challenge to the uninitiated, and by their very attractiveness must often be an incentive to study, which may lead to careers in discovery.

In this group of lectures, several deal with astronomical subjects: *Galaxies,* by Harlow Shapley, Harvard University; *The Problem of the Expanding Universe,* by Edwin Hubble, Mt. Wilson Observatory; and *Energy Production in Stars,* by Hans Bethe, Cornell University. These discussions give lively and entertaining descriptions of the problems confronting the astronomers, and the progress they are making in interpreting the exciting events of cosmic evolution.

Recent progress in the use of electrons for microscopy is presented by V. Z. Zworykin, R. C. A. Research Laboratories, Camden, New Jersey, who discusses *Image Formation by Electrons.* Considerable mathematics must be brought to this reading, if it is to be appreciated properly, and understood. But it is not so difficult to understand the value of electron microscopy when one sees the practical results in images of filterable viruses, and microorganisms much larger than can be obtained by ordinary microscopes.

The other subjects are: *Recent Work in the Field of High Pressures,* by P. W. Bridgman, Harvard; *Recent Developments in Power Generation,* by Lionel S. Marks, Harvard; *Some Fundamental Aspects of Photosynthesis,* by James Franck, University of Chicago; *The Structure of Liquids,* by John G. Kirkwood, Cornell; *The Mode of Action of Sulfanilamide,* by Perrin H. Long, Johns Hopkins; and *Some Scientific Aspects of the Synthetic Rubber Problem,* by Hermann Mark, Polytechnic Institute of Brooklyn.

These volumes have met public acclaim, and they deserve the praise they have received. Their function is to help scientists understand one another, to help the public understand the scientists better and to appreciate the importance of their investigations, and to create a better unity in scientific progress. In addition, they instruct, and entertain, and enrich one's experiences with the universe in which we live, move, and have our being for such a short interval. There is never time enough to understand all that we would of the marvelous world of which we are a part. Such essays as these are inspiring and motivating, and should be made available to all students, and widely to laymen, to the end that better support might be made available for continuing research, especially in those fields which are not measurable in terms of immediate wealth. We can never have too many books of the character of these volumes entitled "Science in Progress."

Charles A. Shull.

All books which are reviewed in *The Chicago Naturalist* are placed in the Reading Room at the Academy and are readily available to all who might like to read them.

The Microscope and Its Use

By Frank J. Munoz and
Dr. Harry A. Charipper

Chemical Publishing Company, Brooklyn, New York, 1943, 334 pages, bibliography, glossary, index, 122 figures and 32 diagrams. $2.50.

This is a welcome addition to microscope literature, written by two men with a fortunate combination of qualifications. Mr. Munoz is technical microscope consultant with one of the largest microscope manufacturers and distributors, while Dr. Harry A. Charipper is professor of biology at New York University.

Modern microscopes are precision instruments, the production of which requires the highest skill in many trades and the greatest perfection in the materials of which they are constructed. It may be said that the microscope is a milestone on the scientific road to knowledge, so it is of the utmost importance that this tool and its accessories be thoroughly understood and correctly used.

The primary purpose of this manual is to teach the *correct* use of microscopes and related laboratory instruments. It is a sad fact that relatively few workers are using their instruments to best advantage, as in obtaining maximum visibility and minimum eyestrain through proper object illumination. If only the single chapter (III) on illumination is completely grasped by the reader, he will feel the price of the manual low indeed. The authors stress the fact that every part must be studied, aligned, kept in perfect condition, and used carefully. They point out the great value of the relatively new polarizing microscope in both industry and in pure science research. The proper care of the polarizing microscope, microtome, and the testing of lenses, magnification, and similar practical laboratory procedures are clearly explained.

If any criticism could be offered, it may be that not sufficient emphasis is given to wave-length of light and its relation to resolution, a subject of particular importance for photomicrographical work.

The section on the history of the microscope is concisely and accurately presented.

A glossary covering the important microscopical terms, a good index, and a short bibliography of available literature in this field add greatly to the usefulness of this book. The manual is up-to-date and well illustrated. It is heartily recommended to the serious student because it gives him the guiding information without going too much into theoretical details and because it incorporates in its limited space references which will enable him to pursue further the subjects of particular interest to him.

V. A. Latham and J. E. Nielsen.

The Useful Plants of the World

By Willard N. Clute

Willard N. Clute & Co., Indianapolis, Ind., 1943, 219 pages. $3.75.

In this, the third edition of *The Useful Plants of the World* readers will note the author has further extended his list of economic plants—particularly of the food plants—and many will find this attractive little book a timely contribution in view of present shortages.

The economic plants of the world are grouped and considered briefly here according to their uses. Thus we find sections on the food plants, the fats and oils, the textiles, and the drug plants. Other chapters treat the beverages and masticatories, the condiments and perfumes, the dyes, soaps and tannins, the gums, resins and rubbers, and wood and wood products. Following each sectional discussion there appears, generally, a summarizing list of the plants in each economic group, together with the common, the scientific, and the family names and the uses of each species. This reviewer sincerely hopes, however, that future editions will not be purposely so limited in the scope of their subject.

Kathryn J. Stephenson.

Plants We Eat and Wear

By H. E. Jaques

Published by the Author, Mt. Pleasant, Iowa, 1943, 171 pages, 328 figures, index. Wire binding $1.50, cloth binding $2.50.

This is Professor Jaques' sixth number in a delightful Pictured-Key Nature Series on aspects of the kingdom of living things. Over three hundred species and varieties are keyed, each with appropriate line-drawings, descriptions, and information on habitat and use. The nature-lover will surely welcome this addition to his library wherever he lives, for the book includes plants grown in all parts of the United States and some plants not generally cultivated here. In key and descriptions technical terminology has not always been avoided, but, wherever used, it is rendered very nearly painless even to the young explorer.

Ten introductory pages on physiology and morphology are somewhat less to the point than the main body of the book. Perhaps it would have been better to omit them entirely than give abbreviated impressions capable of being misconstrued by the neophyte. Fanciful illustrations and remarks that have a markedly contemporary flavor will "date" the book for other years. Greater care could have been taken to catch mistakes in spelling and labels. Nevertheless, the book is assured of a long life of usefulness and charm.

Anna Pedersen Kummer.

Present Day Mammals

By Claude W. Leister

New York Zoological Society, 1931, 74 pages, many illustrations. $ .50, (formerly $1.00).

The reduced price of Dr. Leister's popular survey of recent mammals should be of interest to readers of *The Chicago Naturalist.* This small book, attractively illustrated, lists the mammalian groups systematically and answers many questions for visitors to zoos and museums. This is a worthwhile addition to any natural history library.

Mind, Medicine and Man

By Gregory Zilboorg

Harcourt, Brace and Co., New York, 1943, vi, 344 pages. $3.50.

In *Mind, Medicine and Man* Dr. Zilboorg, an eminent psychiatrist gives an exhaustive analysis of the development of psychiatry and of Freudian psychoanalysis. He makes it clear that he is an ardent disciple of Dr. Freud. His discussion of the conflicts that have arisen between modern psychiatry, a progressive science, and the courts of law, in which ancient legal decisions take precedence over modern scientific knowledge, is of utmost importance. Science must affect our thinking about individuals and group maladjustments, about the management of those who are mentally ill, and about crime and punishment. This book contains much that the lawyer, the legislator, and the social scientist should find of great interest.

N. S. Davis.

The Story of the Moon

By Clyde Fisher

American Museum of Natural History Science Series, Doubleday, Doran and Company, Inc., New York, 1943, 291 pages, bibliography, index, 19 line drawings, 15 halftones. $3.00.

The Story of the Moon, fourth volume in the American Museum of Natural History Science Series, brings together man's knowledge, theories, and popular beliefs—past and present—regarding this much-observed and speculated-upon satellite. Its distinguished author, Dr. Clyde Fisher, honorary curator of the Hayden Planetarium and honorary curator of astronomy of the American Museum of Natural History, has long been particularly interested in eclipses and in investigating resemblances between meteor crater areas on the earth and the topography of the moon.

More than the mere compilation of scientific data, the "meat" in this volume justifies its classification in the text or reference book category, while its easy, non-didactic style places it on the

popular science shelf. Almost every chapter is introduced by an interest-provoking quotation which serves to tie in the subject to be treated with the reader's own celestial observations or literary experience. The diagrams explain methods of measuring, recording and interpreting observations and make clear the causation of tides, eclipses, and other lunar-related phenomena.

In *The Story of the Moon* not only will amateur astronomers find the explanation for many of their observations and the inspiration to undertake new lines of investigation, but to many a general reader it may well prove to be the starting point in the development of an interest in the whole field of astronomy—a subject whose technicalities frequently squelch the initial casual interest of the layman.

Harriet M. Smith.

Earth's Adventures

The Story of Geology
By Carroll Lane Fenton

The John Day Company, 1942, 202 pages. $3.00.

On the jacket of this book the phrase "for young people" appears after the word Geology. This additional phrase sets forth the purpose of the book and explains fully the language style employed and the general plan of the volume.

The writer is the very successful author of several other books which have impressed the lay reader with the fascination of Science, particularly Earth Science. In this book, just as in his *Life Long Ago,* Dr. Fenton impresses the more technical reader with the ease and simplicity with which he unfolds matters which all too commonly are made abstruse and "perfectly meaningless."

Dr. Fenton succeeds so well that this reviewer is reminded of a statement made by another reviewer concerning another book by the same author: "If college professors learned more of Dr. Fenton's style, they would find their classrooms much more popular."

A part of Dr. Fenton's simple strategy in developing "The Story of Geology" is to select some of our National Parks, regions of glaciers and recent volcanic activity and to interpret the geological phenomena there. The skill of his strategy lies in the obvious fact that his selection is quite probably a spot which many of his readers have visited.

In addition to the vivid word pictures created by the author, the book is strikingly illustrated by beautiful photography and illuminating sketches, many of them coming probably from the pen of the author.

John R. Ball.

Minerals and Rocks, Their Nature, Occurrence, and Uses

By Russell D. George

D. Appleton-Century Co., New York, 1943, xviii, 595 pages, 150 figures, 48 plates. $6.00.

This is a timely and much needed reference work in geology and mineralogy. Its systematic treatment of most of the rocks and minerals now known makes it a valuable handbook for both the amateur and the advanced student. It is written in a non-technical style, suitable for use as a textbook in mineralogy and petrology, especially in economic mineralogy. The laboratory and field tests constitute a noteworthy feature which will especially appeal to the amateur for they help to make the task of identification easy and decisive.

The author, now professor emeritus of the University of Colorado, was for many years State Geologist of Colorado, and the cumulative knowledge of a lifetime of study is reflected in this extensive and thorough treatise.

Physically the book is well made and excellently illustrated by a large number of text figures (line drawings of crystals, etc.), and 48 plates in which photographs showing rock formations and structural details are well reproduced.

William E. Menzel.

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